Behavioral Causes of Product Returns in the Seed Supply Chain

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Abstract:

The hybrid seed industry experiences excessive and costly rates of seed returns from distributors. Dealers must order in advance of grower demand realization, and may return unsold seed to manufacturers at the end of the season. Returns impose substantial costs on the manufacturer, including transportation, conditioning, discards and excess production capacity. Here we investigate the processes that lead to high return rates through a model-based field study. We develop a formal dynamic model of sales resource allocation as it interacts with customer and producer behavior in the seed supply chain. While sales representatives know they should carefully position seed types and quantities to match heterogeneous demand by learning about dealer and grower needs, we show, however, that sales agents abandon time-consuming positioning to meet quotas late in the sales cycle. Such sales “push” leads to excessive returns in the next period, increasing the total sales agents must attain to reach their quota, leading them to push still more seed. Model analysis shows how this positive feedback can tip the system into a self-reinforcing high-return equilibrium. We discuss policies to reduce returns and implementation issues that arise. The implications are of general interest because the seed industry is similar to other high-technology, high-velocity industries characterized by short and unpredictable product lifecycles, rapid turnover of SKUs in the catalog, long product development and production delays, and volatile and unpredictable customer demand.

Key words:
Seed returns, resource allocation, sales incentives, hoarding, supply chain management, agribusiness industry, system dynamics, and simulation.